

WHAT IS CLAIMED IS:

1 1. A lyophilized bead suitable for use in the amplification of a nucleic
2 acid sequence, said lyophilized bead comprising:
3 a thermally stable enzyme; and
4 mannitol;
5 wherein said lyophilized bead has a weight percentage of said mannitol of between about
6 53% and about 75% (w/w).

1 2. The lyophilized bead of claim 1, wherein said amplification occurs in a
2 reaction mixture comprising a volume of between about 5 μ L and about 200 μ L.

1 3. The lyophilized bead of claim 1, further comprising a nucleoside
2 triphosphate or a derivative thereof.

1 4. The lyophilized bead of claim 1, wherein said lyophilized bead has an
2 average cross-section of between about 1 millimeter and about 4.5 millimeters.

1 5. The lyophilized bead of claim 1, wherein said weight percentage is
2 between about 62% and about 75% (w/w).

1 6. The lyophilized bead of claim 5, wherein said weight percentage is
2 between about 68% and about 75% (w/w).

1 7. The lyophilized bead of claim 1, wherein said thermally stable enzyme
2 is selected from the group consisting of polymerase, ligase, and combinations thereof.

1 8. The lyophilized bead of claim 1, further comprising a hot start
2 methodology.

1 9. The lyophilized bead of claim 1, further comprising HEPES.

1 10. The lyophilized bead of claim 1, further comprising a probe.

1 11. The lyophilized bead of claim 1, further comprising a reverse
2 transcriptase.

1 12. The lyophilized bead of claim 1, further comprising an internal control.

1 **13.** A lyophilized bead suitable for use in the amplification of a nucleic
2 acid sequence, said lyophilized bead comprising:

3 a forward polynucleotide primer;

4 a reverse polynucleotide primer; and

5 mannitol;

6 wherein said lyophilized bead has a weight percentage of said mannitol of between about
7 53% and about 75% (w/w).

1 **14.** The lyophilized bead of claim 13, wherein said amplification occurs in
2 a reaction mixture comprising a volume of between about 5 μ L and about 200 μ L.

1 **15.** The lyophilized bead of claim 13, wherein said lyophilized bead has an
2 average cross-section of between about 1 millimeter and about 4.5 millimeters.

1 **16.** The lyophilized bead of claim 13, wherein said weight percentage is
2 between about 62% and about 75% (w/w).

1 **17.** The lyophilized bead of claim 16, wherein said weight percentage is
2 between about 68% and about 75% (w/w).

1 **18.** The lyophilized bead of claim 13, further comprising HEPES.

1 **19.** The lyophilized bead of claim 13, further comprising a probe.

1 **20.** The lyophilized bead of claim 13, further comprising an internal
2 control.

1 **21.** The lyophilized bead of claim 13, wherein said nucleic acid sequence
2 is selected from the group consisting of bacterial, fungal, and viral nucleic acid sequences.

1 **22.** The lyophilized bead of claim 21, wherein said bacterial nucleic acid
2 sequence is derived from a member selected from the group consisting of *Bacillus Anthracis*,
3 *Yersinia pestis*, *Clostridium botulinum*, *Francisella tularensis*, Group B *Streptococcus*,
4 *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Xylella fastidiosa*.

1 **23.** The lyophilized bead of claim **21**, wherein said viral nucleic acid
2 sequence is derived from a member selected from the group consisting of Vaccinia, West
3 Nile Fever virus, Equine Encephalitis virus, and Foot and Mouth Disease virus.

1 **24.** A method for the amplification of a nucleic acid sequence, said method
2 comprising:
3 (a) dissolving a lyophilized bead in a liquid, wherein said lyophilized bead
4 comprises:
5 a thermally stable enzyme; and
6 mannitol;
7 wherein said lyophilized bead has a weight percentage of said mannitol of
8 between about 53% and about 75% (w/w), thus forming a reaction
9 mixture; and
10 (b) subjecting said reaction mixture to an amplification reaction.

1 **25.** The method of claim **24**, wherein said reaction mixture further
2 comprises a volume of between about 5 μ L and about 200 μ L.

1 **26.** The method of claim **24**, wherein said reaction mixture further
2 comprises a nucleoside triphosphate or a derivative thereof.

1 **27.** The method of claim **24**, wherein said thermally stable enzyme is
2 selected from the group consisting of polymerase, ligase, and combinations thereof.

1 **28.** The method of claim **24**, wherein said reaction mixture further
2 comprises a forward polynucleotide primer.

1 **29.** The method of claim **24**, wherein said reaction mixture further
2 comprises a reverse polynucleotide primer.

1 **30.** The method of claim **24**, wherein said reaction mixture further
2 comprises a probe.

1 **31.** The method of claim **24**, wherein said reaction mixture further
2 comprises a nucleic acid comprising said nucleic acid sequence.

- 1 **32.** The method of claim **24**, wherein said reaction mixture further
2 comprises HEPES.
- 1 **33.** The method of claim **24**, wherein said reaction mixture further
2 comprises an internal control.
- 1 **34.** The method of claim **24**, wherein said reaction mixture further
2 comprises a hot start methodology.
- 1 **35.** The method of claim **24**, wherein said lyophilized bead has an average
2 cross-section of between about 1 millimeter and about 4.5 millimeters.
- 1 **36.** A method for the amplification of a nucleic acid sequence, said method
2 comprising:
3 (a) dissolving a lyophilized bead in a liquid, wherein said lyophilized bead
4 comprises:
5 a forward polynucleotide primer;
6 a reverse polynucleotide primer; and
7 mannitol; and
8 wherein said lyophilized bead has a weight percentage of said mannitol of
9 between about 53% and about 75% (w/w), thus forming a reaction
10 mixture; and
11 (b) subjecting said reaction mixture to an amplification reaction.
- 1 **37.** The method of claim **36**, wherein said reaction mixture further
2 comprises a volume of between about 5 μ L and about 200 μ L.
- 1 **38.** The method of claim **36**, wherein said reaction mixture further
2 comprises a nucleoside triphosphate or a derivative thereof.
- 1 **39.** The method of claim **36**, wherein said reaction mixture further
2 comprises a probe.
- 1 **40.** The method of claim **36**, wherein said reaction mixture further
2 comprises a nucleic acid comprising said nucleic acid sequence.

1 41. The method of claim 36, wherein said reaction mixture further
2 comprises HEPES.

1 42. The method of claim 36, wherein said reaction mixture further
2 comprises a thermally stable enzyme.

1 43. The method of claim 36, wherein said reaction mixture further
2 comprises an internal control.

1 44. The method of claim 36, wherein said lyophilized bead has an average
2 cross-section of between about 1 millimeter and about 4.5 millimeters.

1 45. A lyophilized bead suitable for use in the amplification of a nucleic
2 acid sequence, prepared by a process comprising:
3 (a) creating an aqueous solution, said aqueous solution comprising:
4 a thermally stable enzyme; and
5 mannitol;
6 wherein said solution has a concentration of said mannitol between
7 about 0.38 M (moles of mannitol/liter of solution) and about 0.99 M
8 (moles of mannitol/liter of solution);
9 (b) quick-freezing the product of (a); and
10 (c) freeze-drying the product of (b).

1 46. The lyophilized bead of claim 45, wherein the product of (c) has an
2 average cross-section of between about 1 millimeter and about 4.5 millimeters.

1 47. The lyophilized bead of claim 45, wherein the product of (c) further
2 comprises a nucleoside triphosphate or a derivative thereof.

1 48. The lyophilized bead of claim 45, wherein said thermally stable
2 enzyme is selected from the group consisting of polymerase, ligase, and combinations
3 thereof.

1 49. The lyophilized bead of claim 45, wherein the product of (c) further
2 comprises a reverse transcriptase.

1 **50.** The lyophilized bead of claim **45**, wherein the product of (c) further
2 comprises a hot start methodology.

1 **51.** The lyophilized bead of claim **45**, wherein the product of (c) further
2 comprises HEPES.

1 **52.** The lyophilized bead of claim **45**, wherein the product of (c) further
2 comprises a probe.

1 **53.** The lyophilized bead of claim **45**, wherein the product of (c) further
2 comprises an internal control.

1 **54.** A lyophilized bead suitable for use in the amplification of a nucleic
2 acid sequence, prepared by a process comprising:

3 (a) creating an aqueous solution, said aqueous solution comprising:

4 a forward polynucleotide primer;

5 a reverse polynucleotide primer; and

6 mannitol;

7 wherein said solution has a concentration of said mannitol between

8 about 0.38 M (moles of mannitol/liter of solution) and about 0.99 M

9 (moles of mannitol/liter of solution);

10 (b) quick-freezing the product of (a); and

11 (c) freeze-drying the product of (b).

1 **55.** The lyophilized bead of claim **54**, wherein the product of (c) has an
2 average cross-section of between about 1 millimeter and about 4.5 millimeters.

1 **56.** The lyophilized bead of claim **54**, wherein the product of (c) further
2 comprises a nucleoside triphosphate or a derivative thereof.

1 **57.** The lyophilized bead of claim **54**, wherein the product of (c) further
2 comprises HEPES.

1 **58.** The lyophilized bead of claim **54**, wherein the product of (c) further
2 comprises a probe.

1 **59.** The lyophilized bead of claim **54**, wherein the product of (c) further
2 comprises an internal control.

1 **60.** A lyophilized bead suitable for use in microanalytic systems
2 comprising:
3 a moisture-sensitive reactant; and
4 mannitol;
5 wherein said lyophilized bead has a weight percentage of said mannitol of
6 between about 53% and about 75% (w/w); and
7 wherein said lyophilized bead has an average cross-section of between about 1
8 millimeter and about 4.5 millimeters.

1 **61.** The lyophilized bead of claim **60**, wherein said weight percentage is
2 between about 62% and about 75% (w/w).

1 **62.** The lyophilized bead of claim **60**, wherein said weight percentage is
2 between about 68% and about 75% (w/w).